

## REMARKS

Upon entry of the present amendment claims 1-3, 6-18, 21 and 23-26 are pending in the application. Claims 1, 24, and 25 have been amended in accordance with the requirements of U.S. patent practice. In addition, claims 6, 7, 10, 15, and 24 have been amended in response to claim objections, as indicated below, and claims 2 and 3 have also been amended to correct certain informalities. New claim 26 has been added. Applicants respectfully request entry of the preliminary amendment.

New claim 26 is supported by the application as originally filed, specifically in para. [0070] on page 4 of the published application US 2010/0137503 A1. Claim 1 has been amended to incorporate limitations from previous claim 24, and claim 24 has been amended to recite limitations from previous claim 25. Claims 1 and 24 have also be amended to recite that the number-average molecular weight of the oligomer or polymer (A) is from 800 to 3000 daltons, as supported in para. [0028] on page 2 of the published application.

Amendments to, cancellation of, and additions to, the claims, as set forth above, are made in order to streamline prosecution in this case by limiting examination and argument to certain claimed embodiments that presently are considered to be of immediate commercial significance. Amendment or cancellation of the claims is not in any manner intended to, and should not be construed to, waive Applicants' right in the future to seek such unamended or cancelled subject matter, or similar matter (whether in equivalent, broader, or narrower form) in the present application, and any continuation, divisional, continuation-in-part, RCE, or any other application claiming priority to or through the present application, nor in any manner to indicate an intention, expressed or implied, to surrender any equivalent to the claims as pending after such amendments or cancellations.

Claims 6, 7, 10, and 24 have been objected to because of certain informalities. 01/20/2011 Office Action at page 3, para. 2. The above amendments are believed to obviate these objections.

**1. Rejection of claims 1-3, 6-15, 21, 23-25 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The Office Action states that the language in amended claim 1 is confusing, because the limitation "wherein the composition is characterized in being prepared in the presence of at least one kind of nanoparticles" is ambiguous. 01/20/2011 Office Action at page 4, para. 1. The Office Action states that the Examiner interprets the limitation as meaning that "the process of hydrolyzing/condensing is conducted in the presence of at least one kind of nanoparticles." The Office Action requests Applicants to clarify their position.

Applicants agree with the Examiner's interpretation of the limitation in question and have amended claims 1 and 24 accordingly. Further support for this interpretation can be found at least in para. [0071] on page 4 of the originally filed application as published.

The Office Action further states that, in claim 15, it is unclear if the recited ratio is on a wt. basis or molar basis.

Applicants have amended claim 15 to indicate that the recited ratio is on a molar basis, as supported at least in para. [0062] on page 4 of the originally filed application as published.

In view of the foregoing amendments and remarks, reconsideration and withdrawal of the rejection of claims 1-3, 6-15, 21, and 23-25 under 35 U.S.C. §112 is respectfully requested.

**2. Rejection of claims 1, 2, 3, 6-14, 21, and 24 under 35 U.S.C. §102(e) as /anticipated by Yamaya et al., U.S. 6,846,568 B2), hereafter "Yamaya."**

The Office Action states as follows:

Yamaya et al. disclose a protective layer preparable from an acrylic polymer-containing composition, and especially a hydrolysable silyl group-bearing acrylic polymer-containing composition in cured form (col. 4, lines 19-24). The acrylic polymer may be prepared from alkoxysilyl group-bearing acrylic monomers (col. 10, lines 10-43) and copolymerizable monomer (meth)acrylate monomers such as methyl methacrylate and glycidyl methacrylate (col. 10, lines 55-57). Working example 3 discloses a free radical polymerization of the three monomers (col. 23) and subsequent hydrolysis/condensation in the presence of acetic acid (col. 23, col. 27).

The prior art further teaches optional inclusion of inorganic fine particles so as to achieve desired hardness, mar resistance and electrical conductivity (col. 11, lines 47-63). Furthermore, fine inorganic oxide particles having an average particle size of 0.001 to 0.1

μm, most preferably 0.001 to 0.05 μm, surface treated with an organometallic compound such as a silane, titanium, aluminum or zirconium coupling agent, are disclosed as being desirable for accomplishing such property improvement (col. 7, lines 35-56)... As noted above, the teaching that fine inorganic oxide particles are to be added to the hydrolyzable silyl group-bearing acrylic polymer prior to the hydrolysis/condensation reactions is implicit because such reactions would afford cured/crosslinked protective layer (col. 11, lines 12-15, col. 12, lines 29-36). Therefore, the process of preparing compositions wherein the hydrolyzing or condensing step is accomplished in the presence of at least one kind of nanoparticles as presently claimed are taught by the prior art reference.

01/20/2011 Office Action at page 5, para. 1, to page 6, para. 1.

Applicants greatly appreciate the detailed basis of rejection but must respectfully disagree in regard to the inventions of independent claims 1 and 24, especially in view of the above amendments to the claims. Yamaya discloses a copolymer derived from epoxy and silane-functional monomers, and this copolymer is used to make an anti-reflective multilayer laminate comprising a protective layer for other layers have specified refractive indices. Abstract and claim 1 of Yamaya. The protective layer can be prepared in an acidic medium comprising aluminum acetylacetonate, a conventional catalyst for such a reaction.

The Office Action refers to Example 3 of Yamaya. This example does not disclose employing nanoparticles as specifically required by claims 1 or 24 and, furthermore, the number average molecular weight is given as 125,000, whereas amended claims 1 and 24 require a number-average molecular weight, for the oligomer or polymer (A), of from 800 to 3000 daltons, a distinct difference relevant to the purpose of the invention. Importantly, Example 3 does not teach hydrolyzing or condensing the oligomer or polymer (A) in the presence of the specified nanoparticles of claims 1 and 24.

The Office Action notes that Yamaya teaches the optional inclusion of inorganic fine particles so as to achieve desired hardness, mar resistance and electrical conductivity. Thus, there is no teaching that hydrolysis and/or condensation takes place in the presence of the nanoparticles. Although the Office Action contends that such reactions may implicitly occur, such speculation would depend on the reaction conditions and the required combinations of materials. In the present invention, the reaction product provides a storage stable composition that can be used, for example, as an automotive clearcoat.

Furthermore, it should be noted that Yamaya does not teach conducting hydrolysis and/or

condensation by the reaction with water in the presence of cationically stabilized nanoparticles employing an organic or inorganic acid. Whereas Yamaya may teach in one example, the use of an acid without nanoparticles and, in another example, the use of nanoparticles with an acid, Yamaya does not remotely teach cationic stabilization of the nanoparticles for use during the hydrolysis and/or condensation. There is no predictable connection between the two isolated elements in Yamaya. In describing the use of fine particles for mar resistance or the like, in col. 11, Yamaya does not remotely suggest their cationic stabilization with acid or their unexpected benefit as a catalyst for hydrolysis and/or condensation.

Reconsideration and removal of the anticipation rejection of claims 1, 2, 3, 6-14, 21, and 24 is respectfully requested in view of the foregoing amendments and remarks.

3. **Rejection of claims 23, 25 under 35 U.S.C. §103(a) as being unpatentable over Yamaya et al (US 6,864,568 B2) in view of Shoup et al (US 6,905,772 B2), hereafter "Shoup."**

The Office Action states:

The discussion with regard to Yamaya et al. above in paragraph 6 is incorporated herein by reference. The prior art fails to disclose compositions comprising nanoparticles that are cationically stabilized. Secondary reference to Shoup et al. discloses abrasion resistant topcoat composition comprising condensates based on hydrolysable silanes having an epoxide group and nanoparticulate inorganic solids having a particle size between 1 to 100 nm (ab.). The prior art further teaches that Lewis acid groups on the particle surface also acts as hydrolysis and curing catalyst during polycondensation reaction (col. 6, lines 40-45). Given the teaching, it would have been obvious to one of ordinary skill in the art to introduce Lewis acid groups, i.e. cationic groups on the nanoparticle surface in Yamaya et al. curable compositions and thereby arrive at the present invention.

01/20/2011 Office Action at page 6, last three paragraphs.

Applicants greatly appreciate the detailed basis of rejection but must respectfully disagree in regard to the inventions of amended independent claims 1 and 24.

Yamaya was discussed above. The Office Action concedes that Yamaya does not disclose nanoparticles that are cationically stabilized.

Applicants understand that Shoup discloses abrasion and impact resistant coating compositions which comprise, as a toughener, a hydrolyzable epoxy silane, specifically GPTMS or 3-glycidoxypropyl-trimethoxysilane. Abstract and Col. 4, lines 30-40. GPTMS does not meet

the requirements of present claims 10-15, but still more significant differences exist.

The Office Action states that Shoup teaches that Lewis acid groups on the particle surface also act as a hydrolysis and curing catalyst during polycondensation reaction, specifically in col. 6, lines 40-45. Applicants respectfully submit, however, that Shoup teaches catalysts that are bases. In col. 6, lines 39-52, Shoup actually teaches away from the present invention. Shoup states that  $\text{Al}^{+3}$  modified silica sol can serve both as a filler and catalyst. Such materials provide a Lewis acid surface that can catalyze the epoxy functionality. Applicants note that a Lewis acid, as defined by IUPAC, is a molecular entity that is an electron-pair acceptor and therefore able to react with a Lewis base to form a Lewis adduct, by sharing the electron pair furnished by the Lewis base. An illustrative example is given by the reaction of trimethylboron and ammonia to give the adduct  $\text{Me}_3\text{BNH}_3$ . In contrast, the present cationically stabilized nanoparticles are stabilized with a Brønsted acid, by which an acid is a molecule or ion that is able to lose, or donate a hydrogen cation (proton,  $\text{H}^+$ ).

In the present examples, Applicants prepared cationically stabilized nanoparticles in Preparation Examples 1 and 2 and then combined them with the copolymer of Examples 1 and 2 in order to prepare the storage stable clearcoat compositions of Example 3. The compositions described in Tables 1 and 3 and, in the two-component clearcoat of Example 6, were found to exhibit unexpected scratch resistance and chemical stability, as shown in Tables 2, 4, and 5.

Taken as a whole, it is respectfully submitted that the cited combination fails to provide the requisite motivation for a prima facie case of obviousness. Reconsideration and removal of the obviousness rejection of claims 23 and 25 is respectfully requested in view of the foregoing remarks.

## CONCLUSION

Applicants respectfully submit that the Application and pending claims are patentable in view of the foregoing amendments and/or remarks. A Notice of Allowance is respectfully requested. As always, the Examiner is encouraged to contact the Undersigned by telephone if direct conversation would be helpful.

Respectfully Submitted,

/Chris P. Konkol/

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